



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
290 BROADWAY
NEW YORK, NEW YORK 10007 -1866

July 9, 2015

BY ELECTRONIC MAIL

Robert Law, Ph.D.
demaximis, inc.
186 Center Street, Suite 290
Clinton, New Jersey 08809

Re: Dispute Resolution Pursuant to Dispute Resolution Provisions of Administrative Settlement Agreement and Order on Consent for Remedial Investigation and Feasibility Study, US EPA Region 2 CERCLA Docket No. 02-2007-2009

Dear Dr. Law:

The U.S. Environmental Protection Agency (EPA) is in receipt of your letter dated July 2, 2015, requesting material relied on by EPA to draw its conclusion that use of data from the 15 centimeter (cm) horizon is appropriate to represent contaminant concentrations in the benthic community exposure zone. On June 12, 2015, the Cooperating Parties Group (CPG) invoked dispute resolution over this issue.

The attached document responds directly to the CPG's June 12, 2015 letter. It also provides the additional material/analysis requested in your July 2, 2015 letter. In addition, contrary to your July 2, 2015 letter, please note that EPA never stated nor implied that the CPG relied solely on the 2005 Sediment Profile Imaging survey conducted by the USACE and NJDOT to support its conclusions on exposure depth. While EPA agrees that the CPG presented multiple lines of evidence to support its position, EPA does not agree that the SPI data and other evidence clearly support an exposure depth of 2 cm.

Please let EPA know when the CPG intends to deliver its written statement as requested by EPA in its June 25, 2015 letter, and feel free to contact me with any questions.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Steph Vaughn", is located below the "Sincerely yours," text.

Stephanie Vaughn, Project Manager
LPRSA 17-Mile RI/FS

Attachment

cc: W. Mugdan, ERRD
R. Basso, ERRD
S. Flanagan, ORC
W. Hyatt, CPG

Attachment

- a. Review of 2005 SPI Data (CPG 6/12/2015 letter, Page 1, Bullet 1 and Page 2, Paragraphs 3 and 4)

To support its position that the benthic community exposure depth in the LPRSA should be 2 cm, the CPG relies in large part upon a Sediment Profile Imaging (SPI) survey conducted in 2005. Note that the survey was conducted 10 years ago by the USACE and NJDOT to support their restoration planning, not by EPA as part of the Lower Passaic River Study Area (LPRSA) RI/FS, and the purpose of the survey was not to determine the biological active zone or depth of exposure for the LPRSA.

Notwithstanding the above, EPA and the CPG agree that the 2005 survey found a shallow anoxic zone, with low Redox Potential Discontinuity (RPD). However, where EPA and the CPG disagree is that the depth of the RPD correlates with the limit of the BAZ. Figure 1 shows all of the feeding void depths found during the survey plotted against the measured depth of the RPD. While the RPD remains below 4 cm at all locations, the feeding void depth varies more widely, up to nearly 15 cm. No correlation between RPD and feeding void depth is shown. In fact, as is shown in Figure 2, only one of the feeding voids found went down to a maximum depth of less than 2 cm.

- b. Review of Finely Segmented Core Data (CPG 6/12/2015 letter, Page 1, Bullets 2, 3 and 4 and Page 2, Bullets 1, 2 and 3)

Between 2005 and 2013, samples were collected from the top 6 inches of sediment at approximately 500 locations in the LPRSA (from Newark Bay to Dundee Dam) to support the 17-mile RI/FS. Sediment was collected from the top 2 cm at only 8 locations. Figures 3 and 4 show the results for 2,3,7,8-TCDD at these 8 locations. For each location, Figure 3 shows the detected concentration at each of the finely segmented core depths in blue, the 15 cm average concentration in pink and the 2 cm to 15 cm ratio of concentrations in brown. Figure 4 shows a cumulative distribution plot of the ratios.

As the figures show, the concentration of 2,3,7,8-TCDD averaged over 15 cm compared to the concentration at the top 2 cm is highly variable. While this is not a statistically valid dataset from which to draw conclusions about 2 cm concentrations across the river, the results do suggest that there are insufficient data from the top 2 cm to evaluate model performance.

Despite the fact that the limited data set shows high variability, based on the modeling files provided to EPA in December 2014, the CPGs modeled predictions over 2 cm are consistently lower than those predicted over 15 cm on a reach averaged basis and over the vast majority of individual grid cells in the LPRSA. Over the duration of the 1995-2013 calibration period, the CPG's model predictions of 2,3,7,8-TCDD in the top 2 cm average less than half of the concentration in the top 15 cm. Given the variability in the limited 2 cm data set, EPA does not have confidence in these modeling results; they would need to be verified through the collection of additional data.

EPA disagrees with the CPG's assertion that the water column contaminant data provide a constraint on the 2 cm bed concentrations, because the water column concentrations are controlled by contaminant concentrations in the fluff layer and the CPG's model includes a parameter to control the transfer of contaminants between the upper layer of the bed and the fluff layer. The combination of the transfer parameter and contaminant concentrations in the upper layer of the bed (below the fluff layer) control contaminant flux to the water column. This provides a non-unique link between the water column and the bed below the fluff layer. While alternate combinations of bed concentrations and transfer parameters could reproduce water column contaminants equally well, the bioaccumulation model would be affected by these alternate choices.

c. Review of Bathymetry Data (CPG 6/12/2015 letter, Page 1, Bullet 5)

The existing bathymetry change dataset cannot resolve changes as finely as 2 cm, due to factors including instrument accuracy and changes in surface sediment density (i.e., reflectiveness). The sediment transport model has been calibrated using the bathymetry change dataset, the accuracy of which is a direct function of the uncertainties of the individual bathymetry datasets, which means that the model cannot reliably predict bed elevation changes at scales as small as 2 cm. This means that there is no way to determine if the solids calculated to be present in the top 2 cm are, in fact, present in a particular grid cell or present but buried by subsequent deposition. Since the contaminant fate and transport model's predictions of contaminant concentrations are driven by bed characteristics passed to it by the sediment transport model, this inability to reliably predict bed elevation changes at 2 cm scales would further add to the uncertainty in the predicted contaminant concentrations in the 2 cm layer. The contaminant fate and transport model cannot be expected to produce reliable estimates of contaminants present in the top 2 cm if the sediment transport model cannot produce reliable estimates of the solids transport at this high level of vertical resolution.

d. Offer to Discuss Collection of Additional Data (CPG 6/12/2015 letter, Page 2, Paragraphs 2 and 5)

As is stated in our June 1, 2015 letter, even though EPA concludes that average model results from the 15 cm horizon reasonably represent contaminant concentrations in the benthic community exposure zone, EPA agrees that varying depths of benthic community exposure zone less than 15 cm may be appropriate for parts of the LPRSA. However, the actual depth that is appropriate under current conditions would need to be quantified. An additional SPI survey designed specifically to answer this question could help determine the actual depth, or depths (if they are found to vary over the length of the river). Then, depending on the results, the decision could be made as to whether additional sediment sampling and/or surveys are warranted. If warranted, more than one round of sampling would be needed to determine the variability of the shallow dataset over time.

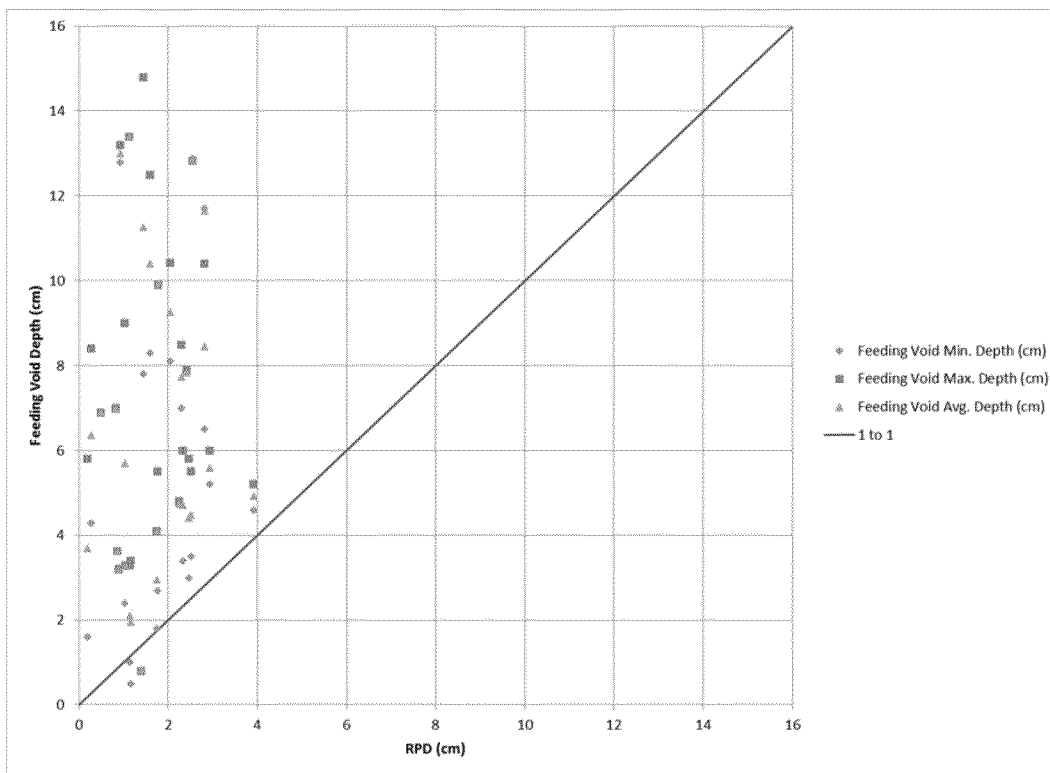


Figure 1 – Feeding Void Depth versus RPD based on results from 2005 SPI Survey conducted by Germano and Associates.

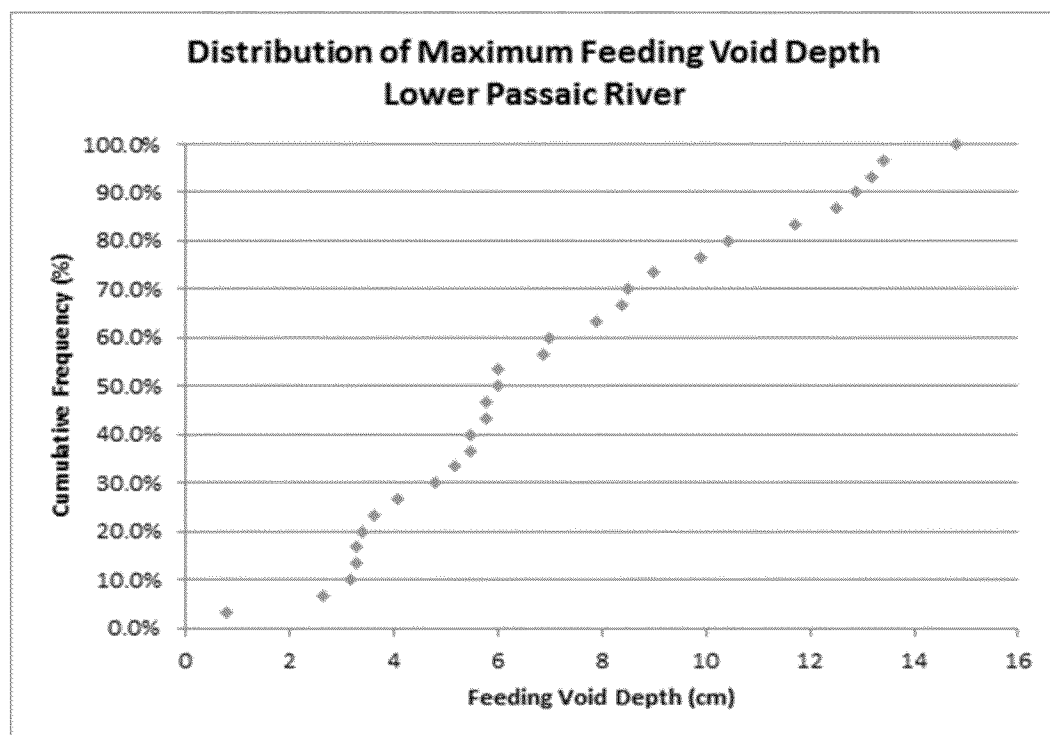


Figure 2 – Cumulative frequency distribution of feeding Void Depth, based on results from 2005 SPI Survey conducted by Germano and Associates.

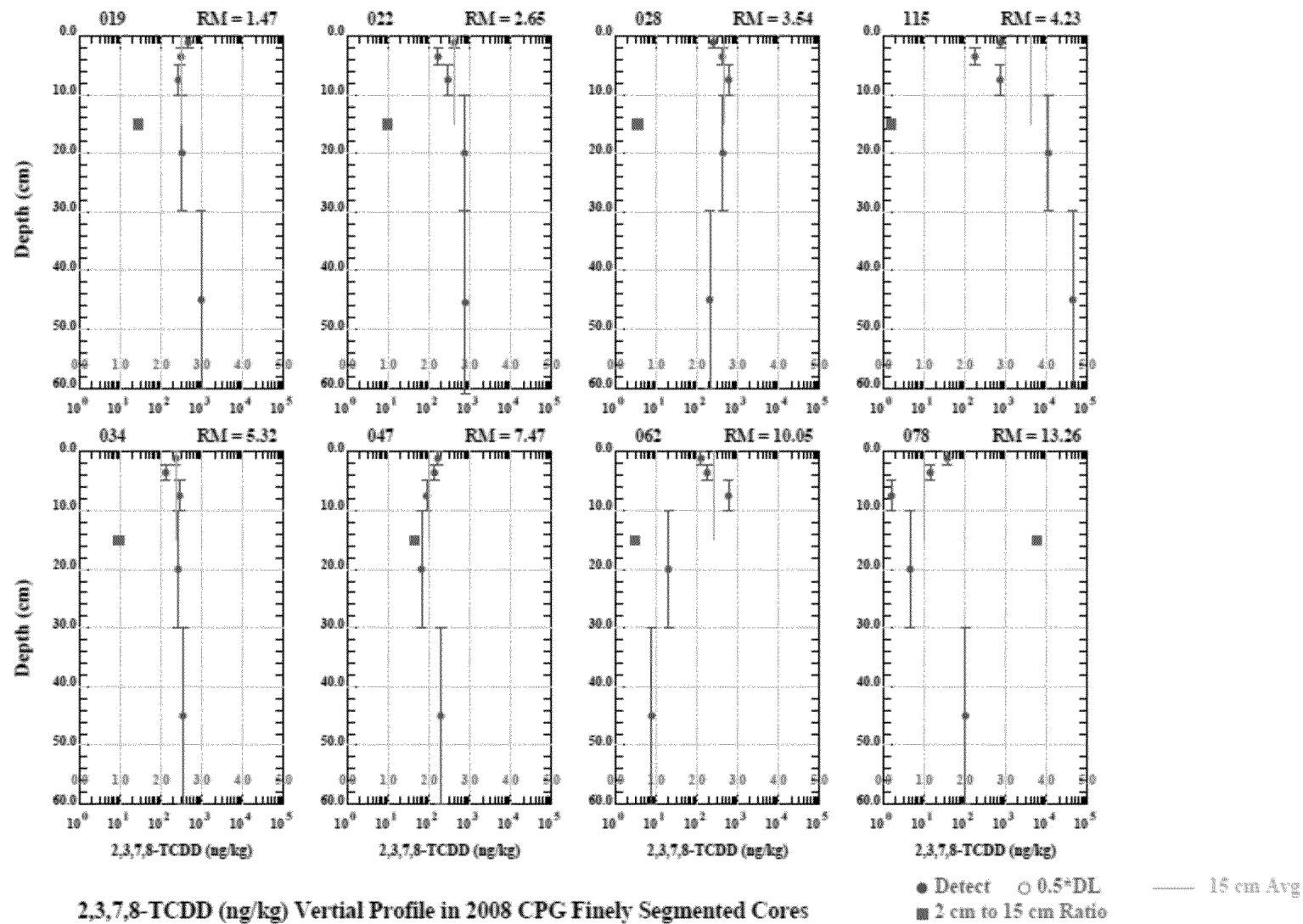


Figure 3

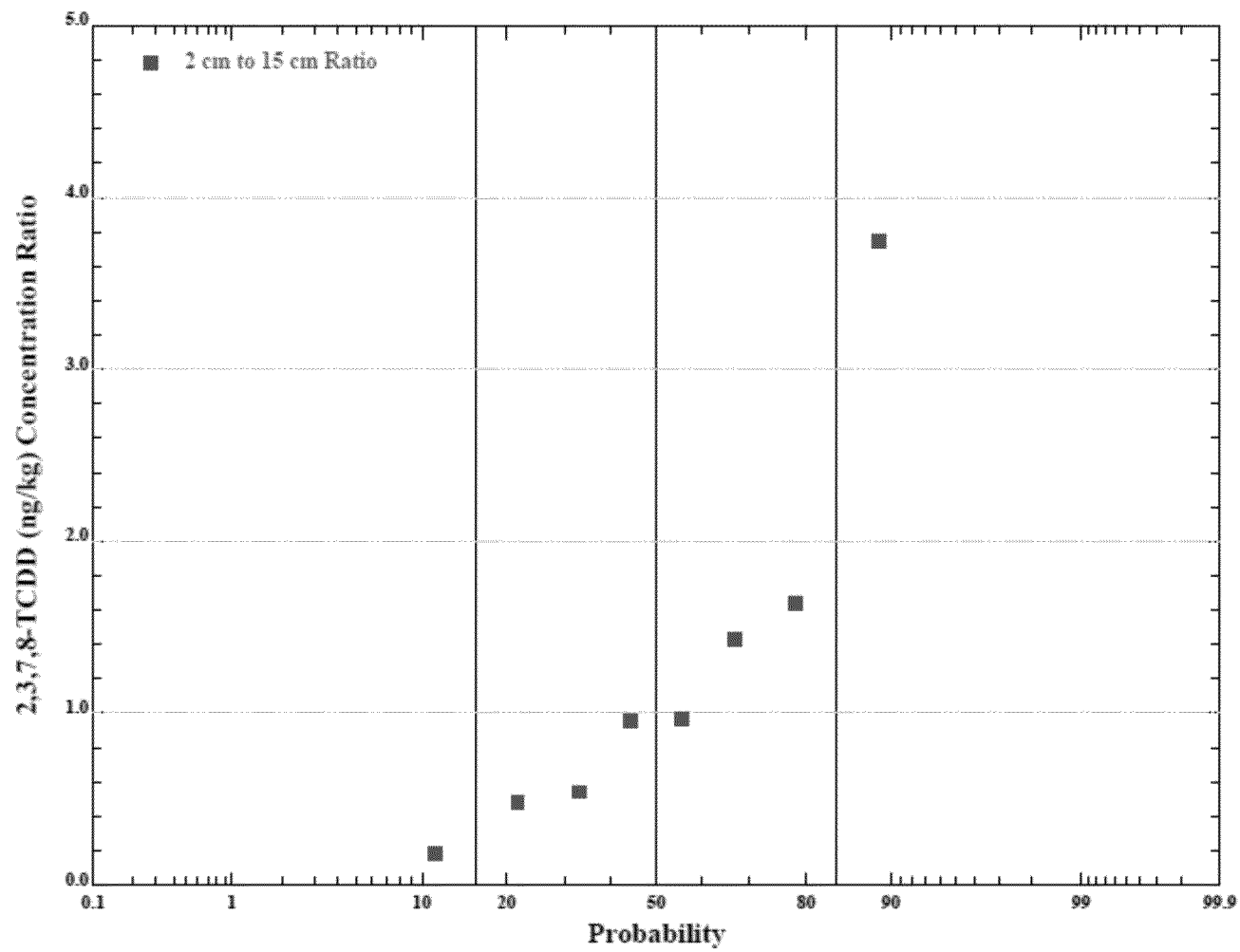


Figure 4